MEMORANDUM

AGRICULTURAL SCIENCES P2
FEBRUARY/MARCH 2016

MARKS: 150

This memorandum consists of 9 pages.
## SECTION A

### QUESTION 1

| 1.1 | 1.1.1 | B ✓ ✓ |
| 1.1.2 | C ✓ ✓ |
| 1.1.3 | A ✓ ✓ |
| 1.1.4 | C ✓ ✓ |
| 1.1.5 | B ✓ ✓ |
| 1.1.6 | C ✓ ✓ |
| 1.1.7 | A ✓ ✓ |
| 1.1.8 | D ✓ ✓ |
| 1.1.9 | D ✓ ✓ |
| 1.1.10 | C ✓ ✓ |

(10 x 2) (20)

| 1.2 | 1.2.1 | D ✓ ✓ |
| 1.2.2 | C ✓ ✓ |
| 1.2.3 | E ✓ ✓ |
| 1.2.4 | A ✓ ✓ |
| 1.2.5 | G ✓ ✓ |

(5 x 2) (10)

| 1.3 | 1.3.1 | Budget ✓ ✓ |
| 1.3.2 | Equilibrium price ✓ ✓ |
| 1.3.3 | Capital ✓ ✓ |
| 1.3.4 | Biometrics ✓ ✓ |
| 1.3.5 | Epistasis ✓ ✓ |

(5 x 2) (10)

| 1.4 | 1.4.1 | Marketing ✓ |
| 1.4.2 | Technical ✓ |
| 1.4.3 | Net Farm Income ✓ |
| 1.4.4 | Skilled ✓ |
| 1.4.5 | Breeding value ✓ |

(5 x 1) (5)

**TOTAL SECTION A:** **45**
SECTION B

QUESTION 2: AGRICULTURAL MANAGEMENT AND MARKETING

2.1 The illustration representing marketing strategy

2.1.1 Marketing strategies
A - Product ✓
B - Price ✓
C - Place ✓
D - Promotion ✓ (4)

2.1.2 TWO factors to consider when planning a product
- Quality ✓
- Design ✓
- Branding ✓
- Packaging ✓
- Size ✓
- Warranty ✓ (Any 2) (2)

2.1.3 TWO ways to implement the strategy
- Advertising ✓
- In-store promotion ✓
- Direct mailing ✓
- Trade fairs and exhibition ✓
- Sponsorship ✓
- Personal selling ✓ (Any 2) (2)

2.1.4 TWO aspects to consider when deciding on pricing
- Cost ✓
- Demand ✓
- Competition ✓ (Any 2) (2)

2.2 Marketing system

2.2.1 Identification of the marketing system
Co-operative marketing system ✓ (1)

2.2.2 THREE advantages of co-operative marketing
- Farmers (producers) will have a better chance to negotiate a good price for their produce ✓
- They will have an access to professional expertise ✓
- They can afford better infrastructure as a group than as individuals ✓
- They can buy fertiliser or packaging material cheaper ✓
- They can develop a brand for their produce which makes them more visible to the potential buyers ✓
- They can access funding from the government as a cooperative ✓ (Any 3) (3)
2.2.3 **TWO principles of co-operative marketing**
- Voluntary membership ✓
- Democratic member control ✓
- Member's economic participation ✓
- Autonomy and independency ✓

(Any 2) (2)

2.3 **Quantities of product 1 and 2 supplied**

2.3.1 **Formulation of hypothesis**
Producers may not increase the supply of agricultural product ✓ even when the price has increased in a short period of time ✓

**OR**

If the price of an agricultural product increases, ✓ the supply may not increase within a short period of time ✓

(2)

2.3.2 **Calculation of price elasticity of supply for product 1 and 2**
- Product 1 = \( \frac{13\%}{20\%} \) = 0,65 ✓

(2)
- Product 2 = \( \frac{39\%}{20\%} \) = 1,95 ✓

(2)

2.3.3 **Interpretation of price elasticity of supply for the two products**
- Supply for product 1 is inelastic ✓
- Supply for product 2 is elastic ✓

(2)

2.3.4 **TWO factors affecting supply of the products**
- Price ✓
- Possibilities of increasing the supply of goods/time ✓
- Technology ✓
- Production costs ✓
- Expectations of the future price ✓
- Environmental conditions ✓
- Subsidies ✓

(Any 2) (2)
2.4 SWOT analysis

2.4.1 Use of SWOT analysis to identify the following

(a) **TWO strengths**
   - Availability of land ✓
   - Services by an extension officer ✓
   - Human resource ✓
   (Any 2) (2)

(b) **ONE weakness**
   - Lack of capital ✓
   - Lack of skills ✓
   (Any 1) (1)

(c) **ONE opportunity**
   - Identified market ✓
   - Services of the extension officer ✓
   (Any 1) (1)

(d) **TWO threats**
   - Unreliable weather ✓
   - Competition from another project/Flourishing project in a nearby village ✓
   - Lack of funds ✓
   - Lack of skills ✓
   (Any 2) (2)

2.4.2 **THREE actions to correct threats**
- Application of scientific methods/use of modern technology ✓
- Establishment of sound market chain ✓
- Consider processing and value adding ✓
- Source interest free funding and subsidies ✓
- Consider training; internships and voluntary hands on experience ✓
(Any 3) (3)

**QUESTION 3: PRODUCTION FACTORS**

3.1 Land as a production factor

3.1.1 **TWO characteristics of land**
- Land is subject to the law of diminishing return ✓
- Land is durable ✓
(2)

3.1.2 **Explanation of the law of diminishing return**
- More units of fertiliser ✓
- Did not result to proportional further increase the yield ✓
(2)

3.1.3 **TWO functions of land from the case study**
- It enables the production of food ✓
- It provides physical space for industry ✓
(2)
3.1.4 **TWO ways to increase productivity of land**
- Changing cropping systems/intercropping/adaptation to scientific methods ✓
- Restoring land potential/halting erosion ✓
- Consolidate small uneconomic land units ✓
- Improving water management/provision ✓ (Any 2) (2)

3.2 **Capital as a production factor**

3.2.1 **Explanation of the assistance of using a cash flow budget**
- It shows the flow of cash into and out of the farming operation ✓
- To determine the profit and loss ✓ (2)

3.2.2 **Monthly income**
- Sale of eggs = R8 000 per week x 4 = R32 000 ✓
- Sale of broilers = R12 500 per week x 4 = R50 000 ✓
  = R32 000 + R50 000 = R82 000 ✓ (3)

3.2.3 **Decision to continue with the business**
Farmer must continue with the business ✓ (1)

3.2.4 **Reason**
- Income is more than the expenditure ✓
- The business is run at a profit. (Profit is R43 000) ✓ (2)

3.2.5 **TWO forms of capital**
- Floating/working capital ✓
- Movable capital ✓ (2)

3.3 **Ability levels of farmers and farm workers**

3.3.1 **TWO skills of farm manager based on graph**
- Planning ✓
- Entrepreneurial ✓ (2)

3.3.2 **One important skill needed by the farm worker**
Technical skill ✓ (1)

3.3.3 **Justification of skill needed by the farm worker**
- Worker needs to perform practical activities ✓
  - using hands ✓ (2)

3.3.4 **TWO management skills important to the farmer other than the skills in the graph**
- Financial ✓
- Communication and interpersonal ✓
- Problem-solving ✓
- Decision-making ✓ (Any 2) (2)
3.3.5 **TWO management principles**
- Planning ✓
- Motivation ✓
- Control ✓
- Implementation ✓
- Control ✓

(Any 2) (2)

3.4 **Labour Legislation**

3.4.1 **21 days leave of absence farm employees entitled to**
Annual leave ✓

(1)

3.4.2 **4 months leave of absence female employees entitled to**
Maternity leave ✓

(1)

3.4.3 **Leave of absence for flu**
Sick leave ✓

(1)

3.5 **Labour**

3.5.1 **Calculation of worker payment during public holiday**
- R111.72 x 2 = R223.44 ✓ OR R111.72 x 2 x 3 ✓ = R670.32 ✓
- R223.44 x 3 = R670.32 ✓

(2)

3.5.2 **Deduction of a labour practice**
Unfair labour practice ✓

(1)

3.5.3 **Justification of answer in QUESTION 3.5.2**
- Worker underpaid/worker received R270.32 less ✓
- Public holidays are double paid according to Public Holiday Act/allowance on public holidays is double the allowance of normal working days ✓

(2)

[35]

**QUESTION 4: BASIC AGRICULTURAL GENETICS**

4.1 **Growth rates between cattle breeds**

4.1.1 **Type of breeding system**
Cross breeding ✓

(1)

4.1.2 **Parents that produced calves with highest average daily gain**
Hereford bulls and Brahman cows ✓

(1)

4.1.3 **TWO reasons for better performance of these calves**
- Offspring have hybrid vigour/heterosis ✓
- Are better adapted to poor veld conditions/more hardy ✓
- Have a better feed conversion rate ✓

(Any 2) (2)
4.1.4

Criteria/rubric/marking guidelines

- Correct heading ✔
- X axis - correctly calibrated and labelled (number crossing) ✔
- Y axis - correctly calibrated and labelled (ADG) ✔
- Correct units (g/day) ✔
- Accuracy ✔
- Bar graph ✔

(6)

4.2 Inheritance

4.2.1 Type of inheritance controlling milk yield

Polygenic inheritance ✔

(1)

4.2.2 Milk yield of a Jersey cow with genotype AAbb

AA = 20+ 20 = 40 litres ✔
AAbb = 200 + 40 litres ✔
= 240 litres ✔

(3)

4.2.3 Phenotypic and genotypic ratio of F1-generation

AABB  x  aabb
AB      x  ab ✔
Genotype : 4  AaBb ✔
Phenotype : all producing 240 litres ✔

(3)

4.3 Inheritance

4.3.1 The phenomenon in QUESTION 4.3

Atavism ✔

(1)
4.3.2 Reason
- A recessive gene for red which was switched off and not expressed √
- In the phenotype in the past is now switched on and expressed √

4.3.3 Alternative term for atavism
Throwback √

4.4 Selection and breeding

4.4.1 Differentiation between selection and heritability
Selection
- is choosing of individuals for breeding purposes √
- due to superior characteristics √

Heritability
- is the degree to which the characteristics are determined √ by genetic factors √

4.4.2 TWO advantages of a species crossing
- They are hardy animals √
- They are drought animals √
- They are highly durable √

(Any 2) √

4.4.3 TWO related breeding systems
- Line breeding √
- Inbreeding √

(2)

4.4.4 Importance of using EBV
It indicates the heritability of a particular characteristic √
to predict the success of a breeding programme √

(2)

4.5 Effects of mutagenic agents

4.5.1 Gamma and X-rays
Damages DNA molecule and causes it to break √

(1)

4.5.2 Metals
Change the chemical structure of a DNA molecule √

(1)

4.5.3 Alkaloids
They prevent chromosome segregation √

(1)

4.5.4 Viruses
They insert their own DNA √

(1) [35]